# Boriding

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Boriding is a thermochemical surface hardening method which can be applied to a wide range of ferrous, non-ferrous and cermet materials. The process entails diffusion of boron atoms into the lattice of the parent metal and a hard interstitial boron compound is formed at the surface. The surface boride may be in the form of either a single phase or a double phase boride layer.

## Benefits

Boriding provides a uniform hardness layer from the surface on to the entire depth of the diffused layer. The hardness achieved is many times higher than any other surface hardening process. The combination of high hardness and low coefficient of friction enhance wear, abrasion and surface fatigue properties. Other benefits associated with boriding are retention of hardness at elevated temperature, corrosion resistance in acidic environment, reduction in use of lubricants and a reduced tendency to cold weld.

## Application & materials

Boriding is carried out on most ferrous materials, with the exception of aluminium and silicon bearing steels, e.g. structural steels, case hardened, tempered, tool and stainless steels, cast steels, ductile and sintered steels and also air hardened steels. In addition, materials such as nickel-based alloys, cobalt-based alloys and molybdenum can be borided. Nickel alloy can be borided without sacrificing corrosion resistance, as well as producing extreme hard surface wear resistance.

Steels which are not suitable for boriding are nitrided steels, leaded and resulfurised steels.

Typical industries:
Oil & gas, agriculture equipment, automotive, stamping, textile, extrusion and injection moulding.

Typical parts:
- Valve components - gates, seats, balls, stems, regulator valves
- Pump components - impellor housings, bodies, plungers, cylinders
- Agriculture equipment - harvesting combine cutters, separators, crop transfer, chopping components
- Automotive - diesel engine oil pumps, gears
- Stamping – dies, tooling
- Textile – grooved drums
- Extrusion and injection mould – moulding augers, barrels, die components

## Process details

The process is a two step reaction. The first step reaction is between the boron yielding substance or compound and the part, which is a function of time and temperature. This results in a thin dense boride layer. This reaction is followed by diffusion, which is a faster process.

Contact us for a quote.